

## CLAIMS

1. A wireless signal switching circuit for switching a plurality of transmitter and receiver signals having different frequencies in wireless communication for communication by at least a first communication system and a second communication system, comprising:
- an antenna terminal (11) connected to an antenna (ANT);
  - a first signal route switching means (20) having a plurality of switch means (21, 23, 24, 60) for selecting a plurality of transmitter and receiver signals having different frequencies (F2 or F3) in the first communication system;
  - a phase rotating means (40) having one end (40a) connected to the antenna terminal (11) and imparting a phase rotation of 90 degrees to the phase of the signal of the frequency component supplied to the first signal route switching means (20); and
  - a second signal route switching means (30) having a diplexer (31) for separating the transmitter and receiver signals having a further different frequency (F1) of the first communication system lower than the plurality of frequencies (F2, F3) in the first communication system explained above and the transmitter and receiver signals of the second communication system, a common input and output terminal (31a) of the diplexer

(31) being connected to the other end (40b) of the phase rotating means, a first filter side terminal (31b) of the diplexer (31) being supplied with transmitter and receiver signals having a further different frequency (F1) of the first communication system, and a second filter side terminal (31c) of the diplexer (31) being supplied with transmitter and receiver signals of the second communication system.

2. A wireless signal switching circuit as set forth in claim 1, wherein

the phase rotating means has a characteristic of attenuating harmonic components of signals transmitted by the second communication system.

3. A wireless signal switching circuit as set forth in claim 1, wherein

the first filter side of the diplexer (31) is a low frequency filter side, and the second filter side of the diplexer (31) is a high frequency filter side.

4. A wireless signal switching circuit as set forth in claim 1, wherein the phase rotating means is provided with:

an inductor (41) having one end connected to the antenna terminal (11) and having the other end (40b) connected to the common input and output terminal (31a) of the diplexer (31),

a first capacitor (42) connected between one

end of the inductor (41) and a reference potential node,

a second capacitor (43) connected between the other end of the inductor and the reference potential node,

5 a first switch means (44, 60) having one end connected to the other end of the inductor (41), and

a third capacitor (45) connected between the other end of the first switch means (44, 60) and the reference potential node, and

10 has the characteristics

that a circuit defined by the inductor (41) and the first to third capacitors (42, 43, 45) imparts a phase rotation of 90 degrees to the phase of the signal of the frequency component supplied to the first signal route switching means (20) when the first switch means is activated and

that a circuit defined by the inductor (41) and the first and second capacitors (42, 43) attenuates the harmonic component of the signal transmitted by the second communication system when the first switch means is de-activated.

5. A wireless signal switching circuit as set forth in any one of claims 1 to 4, wherein

the first communication system is a triple band GSM system, and

the second communication system is a UMTS

system.

6. A wireless signal switching circuit as set forth in claim 5, wherein the first signal route switching means (20) comprises:

5 a first receiver signal switching circuit connected to the antenna terminal (11) and having a plurality of switch means (23, 24) for selecting receiver signals (F2RX or F3RX) having a plurality of different frequencies (F2 or F3) in the first communication system  
10 and

a first transmitter signal switching circuit connected to the antenna terminal (11) and having a switch means (22) for selecting transmitter signals (F2 or F3TX) having a plurality of different frequencies (F2  
15 or F3) in the first communication system and a filter means connected to the switch means.

7. A wireless signal switching circuit as set forth in claim 1, 5, or 6, wherein the second signal route switching means (30) has a switch means (32)  
20 connected to the first filter side terminal (31b) of the diplexer (31) and selecting a transmitter signal having a further different frequency (F1) of the first communication system and a switch means (33) for selecting a receiver signal having a further different  
25 frequency (F1) of the first communication system.

8. A wireless communication apparatus provided

with:

a wireless transmitter and receiver antenna  
(ANT) and

a wireless signal switching circuit as set  
5 forth in any one of claims 1 to 7.

9. A wireless communication apparatus as set forth  
in claim 8, wherein:

the wireless communication apparatus is a  
mobile wireless communication apparatus including a dual  
10 mode compatible mobile phone of a triple band GSM system  
as the first communication system and a UMTS system as  
the second communication system.

10. A wireless communication apparatus as set forth  
in claim 1, wherein:

15 the second filter side terminal of the diplexer  
is connected to a front end of a UMTS use transmission  
and reception circuit, and

the front end has:

a duplexer (561) for switching the UMTS  
20 transmitter signal and UMTS receiver signal,

a low noise amplifier circuit (562) for  
amplifying the UMTS receiver signal input through this  
duplexer, and

a power amplifier circuit (563) for amplifying  
25 the UMTS transmitter signal.